Peripheral nerve surgery in civil life has received attention in the lessening of certain forms of spasticities, in nerve sutures for facial palsy and for palsy of the recurrent laryngeal nerve.

Cervical operations upon the phrenic for intractable hiccough and for immobilization of the diaphragm in pulmonary tuberculosis are receiving consideration.

Resection of the various portions of the cervical sympathetic system or the pain in angina pectoris has been followed in numerous instances by striking relief. It is easily performed under local anesthesia. We have seen patients return to work after long periods of distress and incapacity. It is recognized that such a procedure can have no curative effect on the underlying pathology. Notwithstanding this, the measure of relief has been great enough so that the patients consider it highly satisfactory.

EPILEPSY

Mention should be made of the epilepsies. Certain of the focal epilepsies have a surgical lesion as their basis, and demand surgical attention. In the more common general convulsive states, the convulsions are but a single manifestation of a widespread brain affection. The immediate basis for the convulsions, whether it be circulatory, chemical or from some other cause, is as yet unknown. In such conditions the extreme plight of the patient supplies a field for the overenthusiastic operator. Some epileptics are said to have remained free from convulsions after having had their skulls fractured. Such operators may act only in the role of the traumatizing agents. In the present state of knowledge of the subject, our energies can best be directed toward a solution of the problem rather than to misguided surgical attempts to cure convulsions.

The range of neurological surgery has so widened, and the impetus in its advancement is so great, that the next decade should show many brilliant accomplishments.

The requirements in diagnosis, the character of preparation for such work and the technical procedures themselves are such as to merit specialization in this field. Men interested in it may question the advisability of selecting it on the score that it is too limited. Probably this has always seemed true in contemplating limitation to any specialty. The greater the number of well-trained individuals interested in the same problems, the greater will be the amount of work and the progress in it.

380 Post Street.

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SURGICAL TREATMENT OF DISEASES OF THE COLON

By C. E. PHILLIPS, M. D., *Los Angeles, Calif.*

I believe we can say that the cecostomy performed in the manner outlined furnishes us one of the best possible means of treatment of many of the severe pathologic conditions of the large intestine, sigmoid and rectum, because it allows us to treat them on the sound surgical principles of rest and cleanliness.

DISCUSSION *by A. B. Cooke, Los Angeles; Emmet Rixford, San Francisco; George K. Knapp, St. Helena Sanitarium; Frank H. Paterson, Santa Ana; M. S. Woolf, San Francisco; Rea Smith, Los Angeles.*

THE colon is an organ for absorption and a receptacle for waste. This dual function requires it to be resistant to the most virulent catabolic poisons and at the same time allow the products of digestion to pass readily. The limiting wall which stands between the living organism on one hand and substances capable of destroying it on the other, is the mucosa. In a state of health it permits the passage of water and nourishment, but obstructs the passage of the common substances deleterious to the organism. Certain accidents of nature occur which alter or destroy this function, and a diseased condition results. We may say, roughly, the severity of the disease depends on the disproportion existing between the pathologic factor on one hand, and the tissue resistance on the other.

The etiology of diseases of the colon can be divided into two general classes: predisposing and exciting. Certain conditions arise which predispose to colonic diseases. Many of these bring it about in a twofold way: (1) By lowering the resistance, and (2) by increasing the virulence of the attacking organism.

Probably the first predisposing factor that should be mentioned is stasis. The second is toxins arising from improper food, faulty digestion or decomposition. The third is systemic diseases interfering with the normal process of absorption and elimination. The fourth, anatomic anomalies, malformations, and distortions.

The exciting causes we may classify in order of their importance: First, bacterial and protozoic infections of the colon. Second, animal parasites. Third, catabolic poisons. Fourth, inflammations and new growths extending from adjacent structures.

PATHOLOGY

(It is not the author's intention to take up the subject of pathology of colitis except in a very general way.)

Pathologic conditions of the colon may attain any degree of severity, from a simple inflammatory condition which will recover spontaneously to a fulminating process leading to extensive destruction. When the latter takes place the faculty of tissue repair is lowered. Healing takes place, if at all, with the formation of scar tissue. First, this causes deformities by contraction and interferes with the normal function of the bowel. Second, the scar tissue does not possess the non-abrasive or the non-corrosive faculty of the normal membrane.

The result is that extensive ulceration heals with great difficulty, and when healing does take place

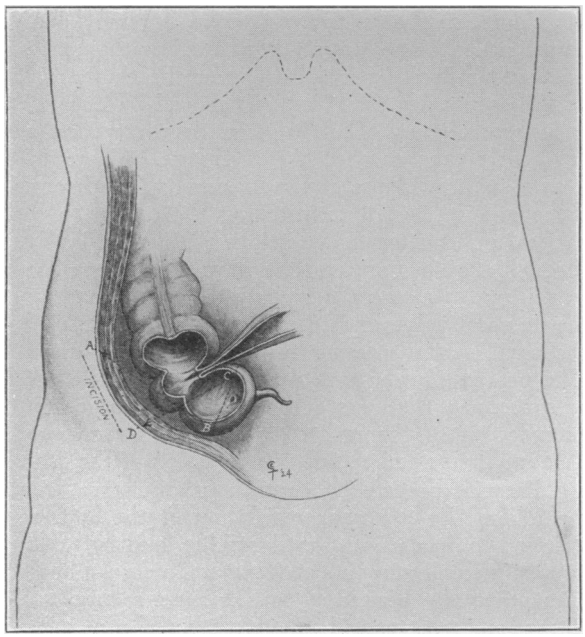

Figure 1.—Shows diagrammatically the position of the ileocecal valve, the caput coli, the appendix, and the part of the cecum (c-b) which is to be stitched to the abdominal wall at (a-d).

recurrences of ulceration are common. Lesions of the bowel may assume almost any form. Perforation from infection is very rare. We can roughly state the greater the destruction the more serious the condition. Hence, our effort should be to prevent extensive damage rather than repair extensive lesions after they have formed.

DIAGNOSIS

To determine the cause of the trouble is not sufficient. We must also ascertain the severity, progress, duration, and extent, before we can intelligently decide upon the treatment to be employed. There are certain aids in diagnosis which must not be overlooked. A careful physical examination, noting the systemic effects of the infection or growths; the x-ray; the proctoscope or sigmoidoscope; the laboratory examination of the excreta and serological tests, are the usual. In some patients an exploratory incision is advisable. From whatever cause the disease arises, a careful and exhaustive study should be made. An early and complete diagnosis must be made if the patient is to receive the maximum benefit from the type of treatment selected.

PROGNOSIS

Prognosis will depend upon: First, condition at institution of treatment. Second, the kind of treatment employed. No line of treatment will restore a colon whose mucosa has been extensively destroyed and from which destruction cicatrices and deformities have resulted. Even the most malignant infection, if treated early by the application of physiologic rest and surgical cleanliness, may be cured without sequellae. We should no more temporize with a destructive lesion of the colon than with a similar condition of the appendix or gall-bladder. While the immediate dangers are not so great in the former, yet if a large number were carefully analyzed, the average morbidity in the severe colitis cases would exceed that of a like number in appendicitis or cholecystitis.

TREATMENT

The difficulty of treating diseases of the colon is apparent. The multiplicity of remedies implies their inefficiency. The two prime essentials for the treatment of infection anywhere are rest and cleanliness. The two prime essentials for treatment of colonic diseases are the same. The difficulty in attaining these conditions renders their application inadvisable except in those cases where failure to employ them may lead to disaster.

By medication and irrigation, direct treatment to the colon is carried out and drugs produce relative rest. Yet the impossibility of relative cleanliness without sidetracking the bowel is evident to all. Without freeing the bowel of irritating contents, rest is not always desirable. The urgency of treatment that will arrest disease process before irreparable injury has been done, is likewise self-evident. Under no circumstances should a patient be taken to surgery when satisfactory healing will take place by simpler means. On the other hand, a patient should not be permitted to reach a state where irreparable damage has been done without recourse to this means.

Let us lay down some general rules where surgery is indicated: (a) *Acute infections* of the colon which have not responded to the usual line of medical treatment and where the continuance of the disease threatents the life of the patient. (b) *Chronic infections* of the colon which have not responded to the usual treatment and which are so severe that a continuance may lead to stricture, malignancy or a serious interference with the general health. (c) *In neoplasms* of the intestine, where it is essential to prevent irritation by diverting the intestinal contents. (d) Where operative work on the large bowel is contemplated, a sidetrack is frequently desirable.

In contemplating an operation of this kind, we must take into consideration certain factors: The first is danger: The operation I shall describe is simple, can be done in case of necessity with a local anesthetic, requires but little time in its performance, and per se should have practically no mortality rate. The second is disability: While the patient with a cecostomy is not confined to bed, to the house, or prevented from attending to light business, yet its employment is sufficiently unpleasant to contra-indicate its use except under certain conditions. The third is nutrition: Nutrition is not seriously affected by sidetracking the entire large bowel. With a careful regulation of diet there is comparatively little inconvenience and even a rapid gain in weight may take place. The fourth is repair: A restoration of the continuity of the bowel is effected with ease when healing has taken place.

OPERATION

The site of operation is in the right iliac region. The object is the temporary sidetracking of the entire lower bowel. An incision is made through the skin as in the McBurney incision for appendectomy. The muscle fibers of the external oblique must be

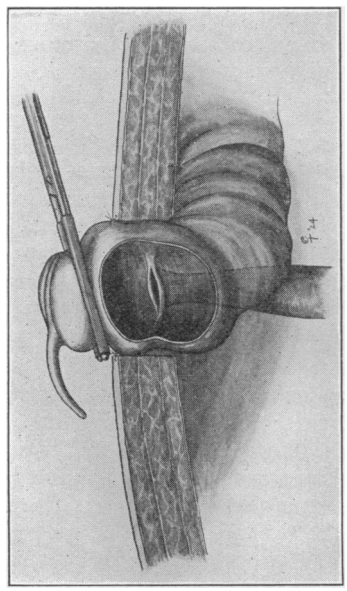

Figure 2.—Shows the selected portion of the caput coli and appendix, presenting through the abdominal wound: the ascending colon is fixed to the abdominal wall by a stitch to prevent a prolapse of the ascending colon and thus interfering with the protrusion of the ileocecal valve. The presenting portion of the cecum is grasped by forceps and the distal portion is to be excised.

more than separated. They must be cut obliquely so that a stricture will not form about the intestine when the partial prolapse occurs. The fibers of the internal oblique and transversalis are cut transversely, or, in other words, the oblique incision is carried through all the layers of the abdomen and extends for a distance of about two and one-half inches. The head of the cecum is brought up, and the portion selected for the opening is just opposite the ileocecal valve, starting about one-half inch from it and continuing around the end of the cecum for a distance of about two inches (Fig. 1). This portion of the cecum includes the appendix and longitudinal band extending to the appendix from the ileocecal valve. The parietal peritoneum is stitched to the visceral peritoneum allowing a fold of the cecum about two and one-half inches longitudinally and one and one-half inches vertically to show, including the appendix. This suture approximates the parietal and visceral layers of the peritoneum. It is put in carefully and must prevent leakage. Before the peritoneum is closed completely, another stitch is applied at the upper angle of the incision fixing the longitudinal band to the parietal peritoneum above the incision (Fig. 3), so that when the partial prolapse of the bowel occurs, the ilio-cecal valve will evert rather than the proximal part of the cecum. The closure of the peritoneum is then completed. The exposed part of the bowel (two inches in length and including the base of the appendix and wide enough to include the entire thickness of the intestinal wall), is grasped with a clamp (Fig. 2). A few stitches are taken to approximate the muscles and fascia to the bowel proximal to the bite of the clamp. Two or three mattress sutures are inserted through the skin and muscular layers approximating them to the cecum. The constricted portion is excised distal to the clamp, so that when the clamp is removed the bowel opens. The wound is covered with petrolatum, and a dressing is applied over the clamp. On the following day the clamp is removed. The bowel opens immediately. Fluffed gauze dressings changed frequently take care of the discharge. There follows a slight prolapse of the ileocecal valve through the opening (Fig. 3). Stitching the cecum to the parietal peritoneum above brings the ileocecal valve through the opening, and we have a complete sidetracking of the entire large bowel. This prolapse of the ileocecal valve remains and thus cuts off entirely the fecal matter passing through the large bowel. The prolapse never exceeds the distance of an inch or so because the mass of the cecum is too great to extrude out of the rather small muscular opening. The small size and sphincter-like action of the opening likewise prevents a continuous discharge from the ileum. By a proper regulation of the diet, restriction to foods with small residue, and by taking liquids in small amounts at frequent intervals, bowel evacuations are limited to two or three a day. Irrigations and treatments to the large bowel can be carried on by flushing either from above or below. Flushing from below and having the flow come out the cecostomy opening lessens peristaltic action, thereby affording more complete rest. After trying various medicinal irrigations, we come to the conclusion that rest is by far the most important agent in practically all conditions requiring the operation. In the acute cases, continuous irrigations through the rectum will tide over many who would otherwise succumb to toxemia. Ulcerative conditions will heal most readily with rest and an occasional mechanical cleansing by flushing with plain water. With the patient relatively comfortable, a colostomy bag is applied which permits getting about in a fairly normal manner. The cecostomy is allowed to remain functioning until complete recovery or maximum improvement of the bowel has taken place. When we are satisfied, after careful examination, that healing is complete or maximum improvement has taken place, the continuity of the bowel is reestablished.

CLOSURE

Anesthesia—A general or regional, but not local, should be employed. A careful cleansing of the colostomy opening, and of the skin about it, should be first performed. An incision is then made around the prolapsed bowel in the muco-cutaneous junction. The mucosa is liberated just sufficiently to permit suturing the edges with the mucosa inverted. This suture is continuous and put in with sufficient care to insure a tight closure. The suture material is some kind of antiseptic catgut. When the closure is complete the entire wound is thoroughly iodized, and then a debridement is performed by dissecting off all the iodine-stained tissue. Whatever infectious material was in the wound is thus fixed by the iodine, and its removal is insured by the excision. Following this the cecum is freed and the peritoneum opened. The cecum is closed by a second layer of sutures which further folds it in until normal peritoneum only is presenting. The restored cecum is

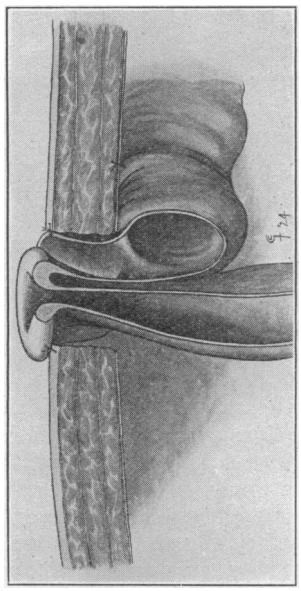

Figure 3. — Shows diagrammatically the ileocecal valve prolapsed and enlarged through the abdominal wall. The opening into the large intestine is just above the ileocecal valve.

dropped back into its normal habitat and the abdominal wall is closed by layer suture.

In conclusion, I believe we can say that the cecostomy performed in the manner I have outlined furnishes us one of the best possible means of treatment of many of the severe pathologic conditions of the large intestine, sigmoid, and rectum, because it allows us to treat them on the sound surgical principles of rest and cleanliness.

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DISCUSSION

A. B. Cooke, M. D. (Hollingsworth Building, Los Angeles)—Doctor Phillips' admirable paper directs our attention to an important and much-neglected subject. We are prone to regard affections of the colon as medical maladies, treating them as such oftentimes until damage has been done which even surgery cannot undo. It is undoubtedly true that early resort to the operative treatment described, in properly selected cases, would reduce both morbidity and mortality.

The technique of cecostomy as outlined by the essayist is clear and possesses the virtues of simplicity and efficiency. A feature of the utmost value is that it permits the ready restoration of the bowel continuity when the therapeutic purpose has been served.

I should like to mention the application of this operation in cases of intestinal obstruction. It is always desirable to relieve the obstruction in acute obstructive conditions by opening the gut as far proximal to the site of stenosis as possible, in order that subsequent more radical surgery may be performed in a relatively clean field. Cecostomy offers this advantage whether the causative lesion be located in ascending, transverse, or pelvic colon. I think this is an important point to bear in mind.

Emmet Rixford, M. D. (1795 California Street, San Francisco)—The technique described by Doctor Phillips for cecostomy is ingenious and would appear to have distinct advantages over the operation as ordinarily performed, particularly because, by virtue of prolapse of the ileocecal valve, practically complete drainage of the intestinal contents can be effected.

It is a question whether cecostomy will altogether supplant appendicostomy where it is desired to maintain an opening in the cecum for a long time for irrigating purposes. As a preliminary operation preparatory to removal of the rectum for carcinoma or syphilitic stricture, I believe left inguinal colostomy is preferable in most cases because of the preservation of the colonic function of absorption of fluids, but it must be done with due regard to the amount of the lower bowel which it is proposed to remove.

George Knapp Abbott, M. D. (St. Helena Sanitarium, Calif.) — Those surgeons who have given to surgical science the most lasting contributions have built their methods upon a careful study of normal and pathologic physiology. Nevertheless, experience is such a valuable teacher that one hesitates to express any decided opinion regarding new procedures.

Severe colitis, without ulceration, is so intimately bound up with pathology of other parts, or even with so-called nerve exhaustion, as to render it more largely a symptom or an accompaniment of other disease than a disease *sui generis*. Its cure is usually a matter of the removal of disturbing nervous factors or reflex nerve irritation originating in pathology of the appendix, pelvic adnexa, gallbladder, focal infection, etc. The field for cecostomy would seem to be largely in ulcerative colitis that resists ordinary non-surgical measures. The importance of complete physiologic rest in the treatment of ulceration of hollow viscera has been well demonstrated in the surgical experience with duodenal ulcer. The success of gastroenterostomy depends upon the completeness with which the food current is diverted through the new opening. Severe or extensive ulcerative colitis yield to cecostomy and appendicostomy. Dr. Phillips' careful technic should give the former a recognized place in physiologic surgery.

Frank H. Paterson, M. D. (Walter L. Moore Building, Santa Ana, Calif.)—The value of cecostomy in the presence of such pathologic conditions of the colon as mentioned by Doctor Phillips has been gaining ever-increasing recognition since the work of Weir in 1902, preceded by a decade by the observations of Councilman and Lafleur and the subsequent work of Musgrave and Clegg.

The manifest benefits of this operation (and also appendicostomy) over all other forms of therapy in those intractable amebic infections so frequent among our veterans of the Spanish-American War who had seen service in the Philippines, gave distinct impetus to its employment in other forms of colon disease.

The technic devised by Phillips appears to possess advantages in the consequent position of the ileocecal valve which serves to cut off entirely the passing of fecal matter through the large bowel, thus enhancing the degree of rest to the latter structure which the operation was principally designed to accomplish. A further factor in its favor is that it does not preclude the possibility of irrigating the lower segment of the bowel either from above or below, should this be indicated. The ease of restoration of the gut to approximate its previous anatomic relations constitutes a third favorable element.

A review of a series of appropriately selected cases in which this technic had been utilized should prove a matter of considerable clinical importance.

M. S. Woolf, M. D. (240 Stockton Street, San Francisco)—The procedure of Doctor Phillips for resting and cleansing the large bowel in certain types of colitis should prove a valuable contribution in treatment of this disease. I see many advantages in unloading the ileum by an opening which is large enough to evacuate everything and yet does not permit fecal contents to pass over the ulcerated surfaces. If cecostomy can be done, it will mean that the ileum is not affected and that the cecum itself is not diseased. There are, however, some patients in which both cecum and lower part of the ileum are the seat of ulcers. Before reading Phillips' paper, I was rather inclined to favor an ileostomy to divert the fecal current, but I see no reason why a cecostomy, with a prolapsing ileo-cecal valve, might not do everything that an ileostomy does, if the cecostomy does not involve a dangerous area. In addition, since the appendix may be made to protrude through the same opening as the cecum, one might give appendicostomy a trial before even entering the cecum. Lockhart Mummery favors an appendicostomy in these cases. Since Doctor Phillips read his paper, I have wished to perform his type of operation, but the only case that has come into my hands since that time had such evident signs of in-

flammation about the appendix and cecum that I was obliged to open the ileum.

REA SMITH, M. D. (1136 West Sixth Street, Los Angeles)—The technic of cecostomy as described by Doctor Phillips interests me very much. I have occasionally done a cecostomy in the ordinary way, usually in a hurry to relieve a complete obstruction lower in the colon, to be followed by a secondary operation. Cecostomy has proven a great benefit at the time of the secondary operation in keeping the gas pressure off the stitch-line, but it has been closed with difficulty.

It seems to me that the operation as described by Phillips can be done just as quickly as the ordinary procedure of stitching the cecum into the wound at its presenting point, and it gives a very much better intestinal drainage at the time it is needed, and is more easily closed afterwards. As a means of sidetracking the colon to provide rest in the treatment of ulcerative colitis, it is certainly a more positive procedure than appendicostomy or simple cecostomy, and I shall use it at my first opportunity.

DOCTOR PHILLIPS (closing)—I want to thank the men who have so ably discussed my paper. The operation is not offered as a cure-all for all gastro-intestinal ailments. The indications for its employment are clearly defined. My hope is that the procedure will be given a fair trial in cases where rest, drainage and disinfection of the colon are indicated. I am sure the procedure will be found as satisfactory in the hands of others as it had been in my own.

Simple cecostomy has been employed in certain diseased conditions of the colon for a long time, and it was in performing this operation that I found that some cases automatically sidetracked the large intestine, while in others only a fistulous opening resulted. In an attempt to analyze the results, the present procedure was devised and has proven very satisfactory in a large number of cases.

Morphin: Before and After Operations—A questionnaire sent out by M. A. Slocum, Pittsburgh (Journal A. M. A.), on the use of morphin before and after operations leads to the following conclusions: The surgical profession is distinctly not in accord regarding the use of morphin before and after operations. The reasons given, by surgeons in general, for not using morphin differ widely. It is a curious fact that one group of prominent men condemns morphin as definitely producing unfavorable symptoms, while another group advocates its use because it prevents these very symptoms. This questionnaire clearly establishes the fact that a majority of surgeons are in favor of morphin pre-operatively and post-operatively in practically all cases. At the present time there is less fear of using morphin in surgery than there was twenty years ago. Whether this should be a danger signal or whether it has come about because of advances in knowledge remains to be proved. An attempt should be made to set some sort of standard by which we can be guided in our use of morphin. While it is admitted that it is difficult to standardize the use of drugs in general, it is felt that morphin is of sufficient importance, and in general enough use in surgery, to merit at least a trial toward standardization. There seems to exist a vast field for research, animal and otherwise, in the therapeutics of morphin. It is true that there is a great deal known about the pharmacology of morphin. However, there is little mention in the literature of work done on animals regarding the effects of morphin on the kidneys, circulation, gastro-intestinal tract and respirations.

Needs More Study—Honey is said to contain all the essentials for animal life. The average quantity of water is 17.2 per cent; mineral salts, 0.75 per cent, and protein derived from pollen of plants, 1.8 per cent. The proportion of grape sugar and fruit sugar to the other solid constituents is ten to one. Honey contains 1.1 per cent formic acid and 0.3 per cent of mallic acid and 0.2 per cent of acetic acid. It is possible that honey contains all the vitamines necessary for life; it is the sole food of the bee.—Lancet.

TREATMENT OF CHOLECYSTITIS

By W. W. BOARDMAN, M. D., *San Francisco*
(From the Gastro-Intestinal Clinic, Stanford University Medical School)

No rule of thumb methods.

It is not primarily a question of medical as opposed to surgical methods.

Many factors, sociological and medical, have a bearing on the choice of treatment.

DISCUSSION *by Walter C. Alvarez, San Francisco; Wade H. Walker, Long Beach; L. G. Visscher, Los Angeles; Charles D. Lockwood, Pasadena.*

NO procedure as yet devised has given uniformly satisfactory results in the treatment of cholecystitis. As our knowledge of the physiology and pathology of the hepato-biliary system increases, we may anticipate the development of more rational and more successful prophylactic and therapeutic measures, but at present this knowledge is far from complete, and our efforts are, therefore, more or less empirical and unsatisfactory. In order that we may have as clear a conception as possible of our therapeutic problem, it will be well to briefly review some of the more recent additions to our knowledge in this field. First it is essential to bear in mind that the gall-bladder is not an isolated and independent organ, but that it is an integral part of the hepato-biliary system, and that factors influencing one part of the system may, and usually do, influence the remaining parts.

There has been much discussion regarding the function of the gall-bladder, but the work of Mann, Rous, MacMaster, and others has demonstrated that it is not essential to life, that it acts primarily to concentrate and store bile in the interdigestive periods, that it apparently acts to decrease the alkalinity of its contents, that it probably acts as a safety valve in the biliary system allowing rapid equalization of pressures, and that it has a mucous secretion.

It is this ability of the gall-bladder to concentrate the bile rapidly and to about one-tenth of its original volume that enables it, with a normal capacity of 50 cc., to store the large amounts of bile secreted in the interdigestive periods. The secretion of bile is continuous, and varies from 500 to 1500 cc. per day, but the excretion of bile into the duodenum is intermittent, occurring normally only during the digestive periods.

The excretion of bile is controlled by the sphincter of Oddi, which relaxes in response to the stimuli produced by digestive products in the duodenum. The resulting discharge of gall-bladder bile is apparently partially due to an active contraction of the gall-bladder as suggested by Meltzer, and partially to a passive emptying in response to the fall in pressure in the common duct. This emptying of the gall-bladder is always incomplete, so that even under normal conditions there is some gall-bladder stasis which may be greatly increased by various abnormal conditions.

Liver bile is alkaline in reaction, but the recent work of Drury shows that in dogs, rabbits, and from a limited number of observations in man also, the gall-bladder bile is acid-neutral, or very weakly alkaline. This decrease in alkalinity, which seems to be produced by the gall-bladder itself is, from Drury's work, of the utmost importance in preventing the precipitation of cholesterol, calcium carbo-